

DESCRIPTIONS OF TWO NEW SPECIES OF THE GENUS TOMOCERUS (COLLEMBOLA, TOMOCERIDAE) FROM SHANXI, CHINA

SUN Yuan^{1,2}, LIANG Ai-Ping^{1*}, HUANG Fu-Sheng¹

1. Institute of Zoology, Chinese Academy of Sciences, Beijing 100080, China

2. Graduate School of Chinese Academy of Sciences, Beijing 100039, China

Abstract Two new species, *Tomocerus* (*Tomocerus*) *nigrus* sp. nov. and *Tomocerus* (*Tomocerus*) *huoensis* sp. nov. are described and illustrated from Shanxi, China. The type specimens of the new species are kept in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

Key words Collembola, Tomoceridae, *Tomocerus*, new species, Shanxi, China.

The genus *Tomocerus* was erected by Nicolet (1842) with *Macrotoma minor* Lubbock, 1862 as the type species (ICZN, 1954). Yosii (1967) divided *Tomocerus* into three subgenera: *Monodontocerus*, *Tomocerina* and *Tomocerus* s. str. Fifty-eight species have been described of the subgenus *Tomocerus* s. str., among which twenty-five species are recorded in China (Chen and Ma, 1997; Zhao et al., 1997; Chen and Christiansen, 1998; Ma and Christiansen, 1998; Liu et al., 1999; Liu, 2003; Ma et al., 2003; Wang, 2003; Chen et al., 2004). Until now, no species of the subgenus *Tomocerus* s. str. has been reported from Shanxi, China.

While examining specimens of Collembola collected from Shanxi, China, we found two new species: *T.* (*T.*) *nigrus* sp. nov. and *T.* (*T.*) *huoensis* sp. nov. They are described below.

All the specimens used in this study are kept in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

The terminology and morphological interpretations used in this paper, if not specified, follow Yosii (1967). Measurements are in millimeters (mm).

1 *Tomocerus* (*Tomocerus*) *nigrus* sp. nov. (Figs. 1-10, Table 1)

Body length 2.9-3.2 mm (Fig. 1).

Color. Ground color yellow. Eye patches black. Four antennal segments dark purple. Ant. and Ant. annulated. Black pigment irregularly scattered on head, body and manubrium. Brown pigment present

on femora and tibiotarsi and black pigment present at coxae of legs. A black arched band connecting eye patches.

Head. Eyes 6 + 6, almost subequal. Antennae 0.58 times as long as body and 2.82 times as long as head. Ratios of Ant. - = 1.00 2.67-3.0 8.67-9.00 2.00-2.17. Thirty setae present on dorsal posterior head. Dorsal macrochaetae of head as shown in Fig. 2. Labral setae 4/5, 5, 4, all smooth; each of distal 3 rows beset on papilla. Anterior margin of labrum with 4 recurved spines (Fig. 3).

Thorax. Macrochaetae and bothriotricha as shown in Fig. 4. Tibiotarsi with numerous pointed smooth setae of varying length; ventral side with 7-8, 7, 7-8 large blunt spiny setae respectively on legs - (Fig. 6). Unguis slender; a pair of pseudonychia well developed, 0.56-0.60 times as long as inner edge of unguis; inner teeth 4-5, 4-5 and 4-5 respectively on legs -. Unguiculus lanceolate without outer tooth or inner tooth. Tenent hair 0.70-0.75 times as long as inner edge of unguis, apex spatulate (Fig. 7). Trochanteral organ reduced to 1, 1 seta (Fig. 5).

Abdomen. Tenaculum unscaled, 4 + 4 teeth, with 7-8 smooth setae on corpus (Fig. 8). Ventral tube unscaled, anterior, posterior and lateral sides with numerous large and small setae. Ratios of manubrium/dens/mucro = 3.0-4.0/2.83-3.6/1.0. Manubrium scaled, with 12 large setae on each dorsolateral side, all mildly ciliate and sharply tapered near apex. Dentes without large setae on outer edge and basal scalelike spine on inner edge. Dental spines pale yellow, arranged as 6-7 (9) / 6, 1. The last large spine has

This work was supported by the Hundred Talent Program and an Innovation Program, both from the Chinese Academy of Sciences and the National Science Fund for Fostering Talents in Basic Research (NSFC-J0030092), all awarded to APL.

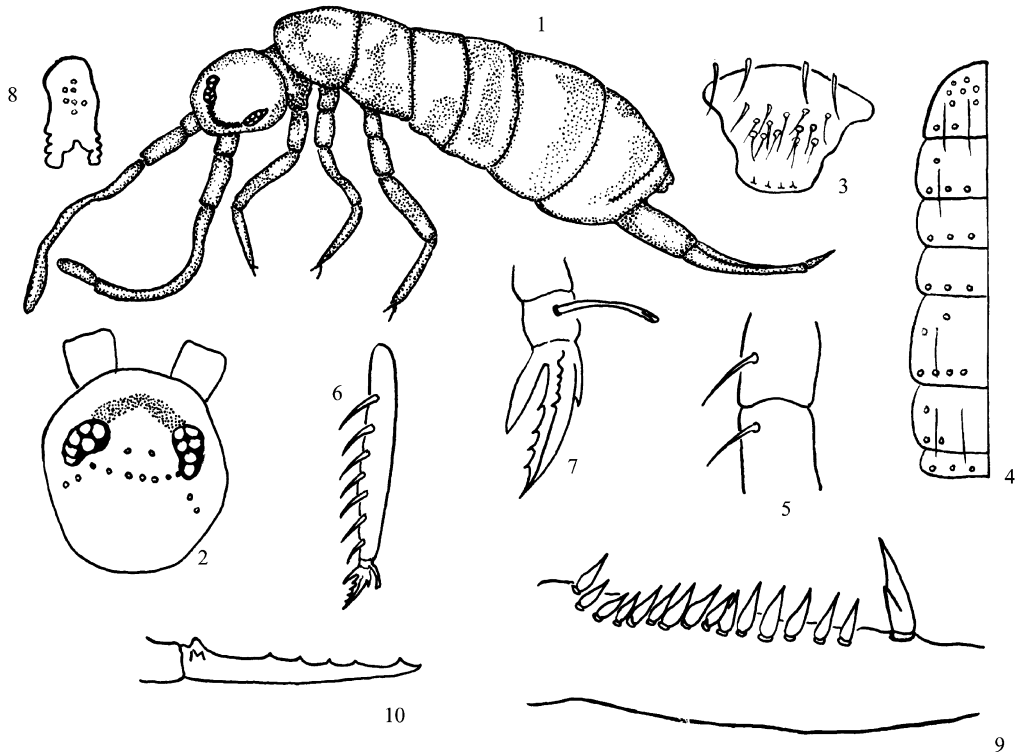
* Corresponding author, E-mail: liangap@ioz.ac.cn

Received 12 July 2006, accepted 10 Aug. 2006.

one plication, others of simple type (Fig.9). Mucro elongate covered with numerous ciliate setae; outer basal tooth with a corner toothlet. Outer dorsal lamella

with 4-5 intermediate minute teeth; apical and anteapical teeth subequal (Fig. 10).

Holotype , China, Shanxi, Heshun (37.3 N,



Figs. 1-10. *Tomocerus (Tomocerus) nigrus* sp. nov. 1. Habitus. 2. Dorsum of head. 3. Labrum. 4. Dorsal chaetotaxy of body (Th. -Abd. V). 5. Trochanteral organ. 6. Hind tibiotarsus and hind claw. 7. Detail of hind foot complex. 8. Tenaculum. 9. Dental spines. 10. Mucro.

113.5 E), 1 180-1 250 m, 24 July 1979, collected by HUANG Fu-Sheng. Paratype 1 , on slide, same data as holotype. Deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

Etymology. The name refers to the black pigment irregularly scattered on head and body.

Remarks. This species is similar to *T. (T.) punctatus* Yosii, 1967, but can be separated from the latter by the characters listed in Table 1.

Table 1. Comparison between *T. (T.) nigrus* sp. nov. and *T. (T.) punctatus* Yosii, 1967.

| Characters | <i>T. (T.) nigrus</i> sp. nov. | <i>T. (T.) punctatus</i> Yosii, 1967 |
|------------------------|---|---|
| Pigment on head | A black arched band connecting eye patches. | No special pigment |
| Th. | Without pattern of pale stripes | With pattern of pale stripes |
| Unguiculus inner tooth | 0 | 1 |

2 *Tomocerus (Tomocerus) huoensis* sp. nov. (Figs. 11-21, Table 2)

Body length 4. 1-4. 3 mm (Fig. 11).

Color. Ground color brownish-yellow. Eye patches black. Ant. annulated, dark purple. Black pigment scattered on anterior part of head. Coxae of front legs with purple pigment anteriorly. A black arched band connecting eye patches.

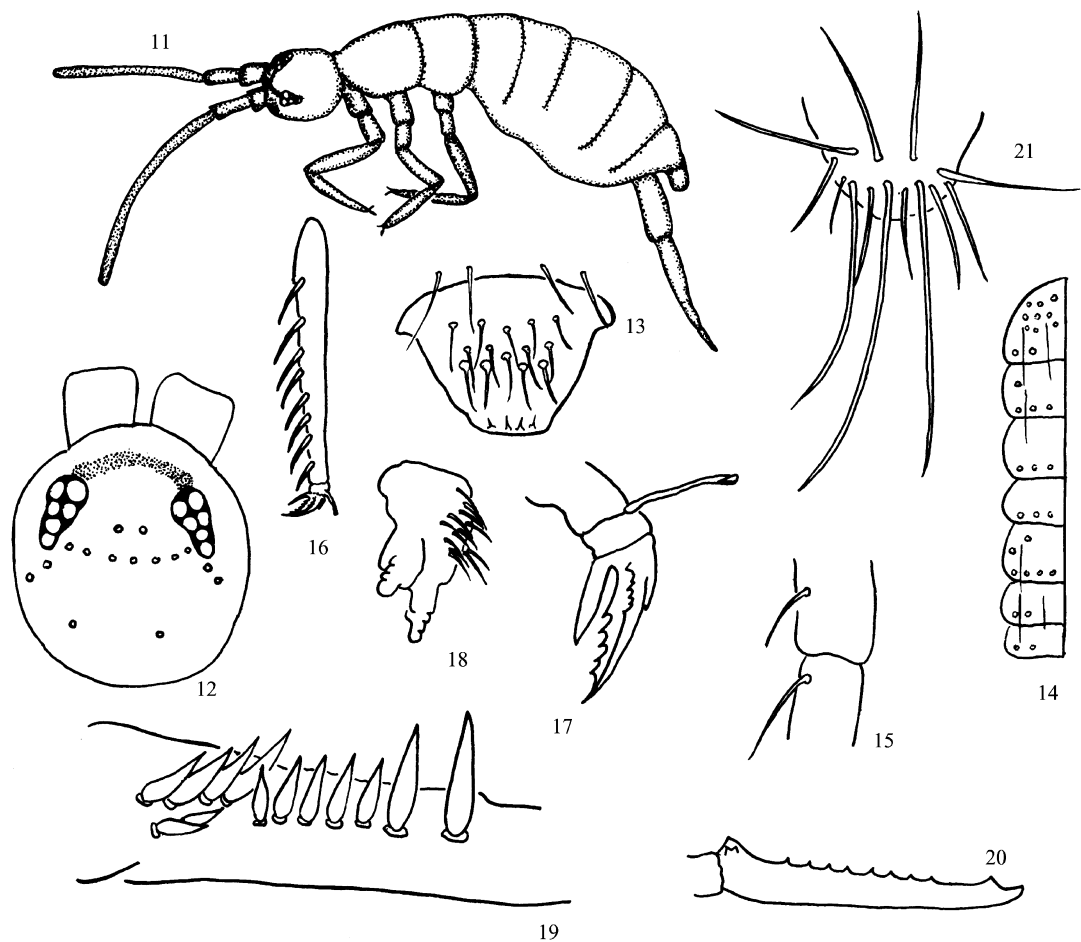
Head. Eyes 6 + 6, almost subequal. Antennae 0.73 times as long as body and 4.28 times as long as head. Ratios of Ant. = 1.00 2.33 11.67. About 12 setae present on posterior head. Dorsal macrochaetae of head as shown in Fig. 12. Labral setae 4/5, 5, 4, all smooth; each of distal 3 rows beset on papilla. Anterior margin of labrum with 4 recurved spines (Fig. 13).

Thorax. Macrochaetae and bothriotricha as shown in Fig. 14. Tibiotarsi with numerous pointed smooth setae of different size; ventral side with 7, 7, 8 large blunt spiny setae respectively on legs - (Fig. 16). Unguis slender; a pair of pseudonychia well developed, 0.5 times as long as inner edge of unguis; inner teeth 6, 5 and 5 respectively on legs - . Unguiculus lanceolate without outer tooth or inner

tooth. Tenent hair thick, almost the same length as long as inner edge of unguis, apex spatulate (Fig. 17). Trochanteral organ reduced to 1, 1 seta (Fig. 15).

Abdomen. Tenaculum unscaled, 4 + 4 teeth, with 13-17 smooth setae on corpus (Fig. 18). Ventral tube unscaled, anterior, posterior and lateral sides with numerous large and small setae. Ratios of manubrium/dens/ mucro = 3.0-3.5/4.5-4.67/ 1.0. Manubrium scaled, with 12 large setae on each dorsolateral side,

all mildly ciliate and sharply tapered near apex. Dentes without large setae on outer edge and basal scalelike spine on inner edge. Dental spines formula as 4-6/ 5-9, 2, pale brown, of simple type (Fig. 19). Mucro elongate covered with numerous ciliate setae; outer basal tooth covered with a corner toothlet. Outer dorsal lamella bearing 8-9 intermediate minute teeth; apical and anteapical teeth subequal (Fig. 20). Upper anal flap of male as shown in Fig. 21.



Figs 11-21. *Tomocerus (Tomocerus) huensis* sp. nov. 11. Habitus. 12. Dorsum of head. 13. Labrum. 14. Dorsal chaetotaxy of body (Th. -Abd.). 15. Trochanteral organ. 16. Hind tibiotarsus and hind claw. 17. Detail of hind foot complex. 18. Tenaculum. 19. Dental spines. 20. Mucro. 21. Upper anal flap of male.

Holotype , China , Shanxi , Huo County (36.5° N, 111.7°E) , 1 800 m , 23 July 1979 , collected by HUANG Fu-Sheng. Paratypes 4 , on slides , same data as holotype. Deposited in the Institute of Zoology , Chinese Academy of Sciences , Beijing , China (IZCAS) .

Etymology. The new species is named after the type locality.

Remarks. This species is similar to *T. (T.) zayuensis* Huang et Yin, 1981 , but can be separated from the latter by the characters listed in Table 2.

Table 2. Comparison between *T. (T.) huensis* sp. nov. and *T. (T.) zayuensis* Huang et Yin, 1981.

| Characters | <i>T. (T.) huensis</i> sp. nov. | <i>T. (T.) zayuensis</i> Huang et Yin, 1981 |
|-----------------------------|---|---|
| Dental spine formula | 4-6/ 5-9, 2 | 4-5/ 4, 2 |
| Mucronal intermediate teeth | 8-9 | 5-6 |
| Pigment pattern on head | A black arched band connecting eye patches. | No special pigment |
| Setae on corpus | 13-17 | 5 |

Acknowledgments We would like to thank Dr. K. A. Christiansen of Grinnell College (USA) and Prof.

R. Jordana from University of Navarra (Spain) for providing us with literature. Thanks are also given to Prof. CHEN Jian-Xiu of Nanjing University, who gave us very useful suggestions.

REFERENCES

- Chen, J-X and Christiansen, K. A. 1998. *Tomocer* (s. s.) *spinulus* (Collembola: Entomobryidae), a new species of Chinese springtail. *Entomological News*, 109 (1): 51-55.
- Chen, J-X and Ma, Y-T 1997. A new species of the genus *Tomocer* (s. s.) (Collembola: Tomoceridae) from China. *Entomotaxonomia*, 19 (3): 157-160.
- Chen, J-X, Ma, Y-T and Christiansen, K. A. 2004. Re-examination of three species of *Tomocer* s. l. (Collembola: Tomoceridae) from China. *Journal of Entomological Science*, 39 (3): 303-310.
- Christiansen, K. A. 1964. A revision of the Nearctic members of the genus *Tomocer* (Collembola: Entomobryidae). *Revue d'Ecologie et Biologie du Sol*, 1: 639-677.
- Huang, F-S and Liu, H 1995. Three new recorded species of *Tomocer* Nicolet in China (Collembola: Tomoceridae). *Sinozoologia*, 12: 192-193.
- Huang, F-S and Liu, H 1999. Collembola. In: Huang, B-K (ed.), *Fauna of Insects in Fujian Province of China*, 1, Fujian Science and Technology Press, Fuzhou. 19-21.
- Huang, F-S and Yin, H-F 1981. Collembola: Tomoceridae-*Tomocer* Nicolet. In: *Insects of Xizang*, 1. Science Press, Beijing. 41-46.
- International Commission of Zoological Nomenclature 1954. Opinion 239. *Tomocer* Nicolet, [1842] (Insecta, Collembola): Designation under the plenary powers of a type-species in harmony with accustomed usage. *Bulletin of Zoological Nomenclature*, 4 (29): 361-372.
- Liu, Y-Q 2003. A new species of the genus *Tomocer* (s. str.) (Collembola: Tomoceridae) from China. *Journal of Southwest Agricultural University*, 25 (3): 214-215.
- Liu, Y-Q, Hou, D-B and Li, Z-C 1999. Four new species of *Tomocer* (Collembola: Tomoceridae) from China. *Entomotaxonomia*, 21 (4): 239-245.
- Ma, Y-T and Christiansen, K. A. 1998. A new species of *Tomocer* (s. s.) (Collembola: Tomocerinae) from China. *Entomological News*, 109 (1): 47-50.
- Ma, Y-T, Chen, J-X and Christiansen, K. A. 2003. A new record of *Tomocer* baicalensis from China with its redescription (Collembola: Tomoceridae). *Entomological News*, 114 (1): 47-50.
- Nicolet, H. 1842. *Recherches pour Servir à l'Histoire des Podures*. Nouvelles Memoires Helvetique Science Naturelle, 6: 1-88.
- Wang, S-Z 2003. Twenty-five species of Collembola from China. *Journal of Central South Forestry University*, 23 (1): 64-67.
- Yosii, R. 1967. Studies on the Collembolan family Tomoceridae, with special reference to the Japanese forms. *Contributions from the Biological Laboratory Kyoto University*, 20: 1-54.
- Zhao, L-J, Tamura, H. and Ke, X 1997. Tentative checklist of Collembolan species from China (Insecta). *Publication of Itako Hydrobiological Station Ibaraki University*, 9: 15-40.

山西鳞尾属二新种记述 (弹尾目, 鳞尾科)

孙元^{1,2} 梁爱萍¹ 黄复生¹

1. 中国科学院动物研究所 北京 100080
2. 中国科学院研究生院 北京 100039

摘要 记述采自山西地区的弹尾目 Collembola 鳞尾科 Tomoceridae 鳞尾属 *Tomocer* 2 新种: 黑鳞尾 *Tomocer* (*Tomocer*) *nigrus* sp. nov. (山西: 和顺禅堂寺) 和霍县鳞

关键词 弹尾目, 鳞尾科, 鳞尾属, 新种, 山西, 中国.

中图分类号 Q969.4

尾 *Tomocer* (*Tomocer*) *huoensis* sp. nov. (山西: 霍县七里峪侧尾)。新种模式标本保存在中国科学院动物研究所。